REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1, 4-8, 10, 16 and 17 are pending in the present application. Claim 1 has been amended, claims 11 and 15 have been canceled and claim 17 has been added by the present Amendment.

In the Outstanding Office Action, the drawings and specification were objected to; claims 1, 4-8, 10, 11, 15 and 16 were rejected under 35 U.S.C. § 112, second paragraph; claims 1, 4-8, 10, 11, 15 and 16 were rejected under 35 U.S.C. § 103(a) as unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Tepman et al. or Dubois et al.; and claims 4 and 10 were rejected under 35 U.S.C. § 103(a) as unpatentable over AAPA in view of Tepman et al. or Dubois et al. and Rempei Nakata.

Regarding the objection to the drawings and specification, Applicants respectfully attach slides from a "slide show" that was emailed to the Examiner to illustrate how the substrate is loaded and unloaded. The attached "slide show" is referred to as Appendix A in this response and includes slides illustrating the loading process of the substrate. In particular, the first slide illustrates Figure 1 of the present application (the Related Art). As shown in the first slide (i.e., slide 1), the glass substrate 4 is supported by lift pins 6 and the robot arm 8 is in a position that it can be withdrawn from the process chamber. Thus, Figure 1 of the present application and the slide 1 illustrate the situation just before the robot arm 8 is removed from the process chamber, and the deposition process begins. The loading and unloading of the substrate is conventional and described as related art in the present application. The problems with the conventional

loading of the substrate are what is addressed in the present application. However, a detailed description of the conventional loading and unloading of the substrate will now be given with respect to the attached "slide show" in Appendix A.

As shown in the slide 2, there are four stages of the conventional loading and unloading operation of the substrate. The four stages include 1) the exchange position, 2) the load position, 3) the process position and 4) the spacing position. Slide 3 illustrates where the specification supports the four stages or steps of the conventional loading and unloading of the substrate. Next, slide 4 illustrates the exchange position. As shown, the robot arm 8 is moving in a horizontally forward direction to place the substrate 4 over the lift pins (or insert pins) 6. Slide 5 shows the robot arm 8 having moved in the horizontally forward position to a point that the substrate 4 is placed over the lift pins 6. The second stage is referred to as the loading position. Note that the lift pins are extended in slides 4 and 5 (see also paragraphs [0006] and [0012] of the original application).

In the second stage (i.e., the loading position), the support bar 20 is moved upward such that the lift pins contact the substrate 4 and lift the substrate 4 off from the robot arm 8 (see also paragraphs [0012] and [0013] of the original application). Note that the lift pins 6 are placed at a position that is outside of the robot arm 8 such that the lift pins 6 contact a surface of the substrate 4 that is outside the robot arm 8 (and thus the lift pins 6 do not contact or hit the robot arm 8). Figure 1 of the present application (and the attached slide 1) illustrate this scenario in which the support bar 20 has been raised upward so as to lift the substrate 4 off of the robot arm 8 via the lift pins 6. Thus, the substrate 4 is only supported by the lift pins 6 and the robot arm 8 can be removed from the processing chamber, which is referred to as the third stage (see also

paragraph [0013] and the first sentence in paragraph [0014] of the original application).

In more detail, slide 6 illustrates the third stage or process position in which the substrate 4 is supported by the lift pins 6 and the robot arm 8 has been removed from the process chamber. As shown in slide 6, the problem with the conventional loading and unloading process is that the ends of the substrate 4 tend to bend. In addition, the support bar 20 is then lowered so as to lower the substrate 4 onto the susceptor 10 while the lift pins 6 are also retracted or inserted into the susceptor 10 (see also paragraph [0014] of the present application). Slide 7 illustrates the glass substrate 4 resting against the susceptor 10 and the lift pins 6 being withdrawn. The deposition process may then begin at this point as shown in slide 7. A reverse process is then performed to remove the processed substrate from the chamber.

Figures 1-4 of the present application illustrate the conventional loading and unloading process described above and the problems associated with this process. However, Figures 2-4 are being amended to more clearly illustrate the features related to the conventional loading and unloading of the substrate. In particular, original Figure 2 illustrates the robot arm 8 in solid lines, which makes the robot arm 8 to appear on top of the substrate 4. Amended Figure 2 fixes this informality. It is respectfully submitted this does not add new matter as Figure 1 clearly shows the robot arm 8 being under the substrate 4. Figure 2 is also being amended to more clearly illustrate the lift pins 6 and to illustrate the location of the stopper pins 28. In particular, the stopper pins 28 were illustrated in Figure 1 as being inside of the outside edge of the substrate 4, which clearly can not be the case, because the stopper pins 28 stop the sliding of the substrate 4 when the substrate 4 is moved downward onto the susceptor 10. Thus, Figure 2 has been amended to illustrate the stopper pins 28 being on an outside of the outside edge of the

substrate 4 (original Figure 3 also illustrates the stopper pins 28 being on the outside of substrate 4). Note that the lift pins 6 are also shown with dotted-lines as they are underneath the substrate 4 (also as shown in Figure 1). It is respectfully submitted the amendments made to Figure 2 are supported be the features shown in Figure 1. That is, Figure 2 is a top view looking at a top of the apparatus in Figure 1.

Next, Figure 3 has also been amended to more clearly illustrate how the substrate 4 slides a distance of 5mm from when it contacts and slides along the susceptor 10 as the substrate 4 is lowered onto the susceptor 10 (the attached slides 6 and 7 illustrate this feature as discussed above). Original Figure 3 also illustrated the lift pins 6 in solid lines and being partially outside of the substrate 4, which is clearly inaccurate when referring to Figure 1. Accordingly, Figure 3 has been amended to illustrate the lift pints 6 as being shown in dotted-lines to illustrate the lift pins 6 as being under the substrate 4 as shown in Figure 1. The reference numeral 5 in original Figure 3 has also been removed as it is not discussed in the original specification. Original Figure 3 illustrates the portion where the substrate 4 slides after contacting the susceptor until being stopped by the stopper pins 28 as being 5 mm. Paragraph [0019] of the original application has been amended to more closely correspond with Figure 3.

Figure 3 has also been amended to illustrate the portion at which the substrate 4 first contacts the susceptor 10 and then slides 5 mm before contacting the stopping pins 28. The amount of sliding is illustrated as reference numeral 9 and is shown as dotted-lines. Note that the substrate 4 slides in all four directions on the susceptor 10 when it is lowered onto the susceptor 10. Thus, the amount of sliding 9 is illustrated as occurring in all four directions on the susceptor 10 in amended Figure 3. Original Figure 3 also illustrates this feature, but does so in solid lines.

Next, original Figures 4A-4D and the corresponding description in the specification illustrate and describe a slide part 41 of the susceptor 10. Note that the slide part 41 is where the substrate 4 slides along the susceptor 10. As shown in original Figures 4A-4D, the susceptor 10 includes a U-shape in which sliding parts 41 exist around the entire outside edges of the susceptor 10. Figures 4A-4D only illustrates one edge of the susceptor 10 for convenience purposes. The original specification also describes the substrate 4 sliding on the sliding part 41 until contacting the stopping pins 28 (see paragraphs [0018] and [0019] of the original application). Accordingly, Figures 4A-4D are being amended to illustrate the stopping pins 28 being located on the sliding part 41. The 5mm sliding amount shown in Figure 3 is also being shown in Figures 4A-4D. Thus, with reference to Figure 4A, the substrate 4 slides along the sliding part 41 of the susceptor 10 as it is lowered onto the susceptor 10. Figures 4B-4D illustrate problems related to the conventional loading of the substrate 4 in which the substrate 4 contacts excess material 11 from a previous deposition process and tends to break. In addition, Figure 4A-4D have been amended to illustrate that the substrate 4 is inclined at about 85 degrees from the vertical when it approaches the susceptor 10. That is, the substrate 4 tends to bend due to its own weight, the heat in the chamber, etc. The original specification indicates the robot arm 8 is inclined at 85 degrees. However, this is a translational error and should state the substrate 4 is inclined at 85 degrees. Paragraph [0019] of the original specification has accordingly been appropriately updated. An English translation of the claimed priority document and statement indicating the translation is accurate can be submitted if needed.

Thus, it is believed the enclosed amended Figures 2-4 and the above-description sufficiently describe the conventional loading and unloading operation of the substrate 4.

Accordingly, it is respectfully requested the objections to the drawings and specification be withdrawn.

Further, regarding the rejection of the claims under 35 U.S.C. § 112, second paragraph, the objected to subject matter has been removed from the claims. Accordingly, it is respectfully requested this rejection be withdrawn.

Next, the embodiments of the present invention will be described with respect to Figures 5-10. Comments will also be presented distinguishing the pending claims over the applied art. Support for changes to the claims and Figures 5-10 will also be exaplained. In more detail, amended Figure 5 illustrates a groove 44 being formed around all sides of the susceptor 30. Note that original Figure 5 also illustrates the groove 44 being formed around all sides of the susceptor 30. The groove is formed around all sides of the susceptor 30 because the substrate 34 tends to slide in all four directions. Thus, the groove 44 advantageously collects scraped off material (which may have been deposited in a previous deposition operation). The robot arm 35 has also been amended to use dotted-lines where it is under the substrate 34. The lift pins 36 have been similarly amended.

In addition, as shown in Figure 5, the amount the substrate 34 can slide before contacting the stopping pins 40 is increased to 10 mm from 5 mm in the conventional art. Figure 6 has also been amended to clearly show the 10 mm amount shown in Figure 5 and described in the present application (see paragraph [0041] of the original application). This feature combined with the groove 44 being disposed around four sides of the susceptor produce particular advantages. For example, as described in paragraph [0041] of the present application, ". . . to make the transfer stable upon the transfer and the conveyance of the robot arm 35 ... the gap between the part

where the glass substrate 34 is safely positioned and the stopper pin 40 is increased to be 10 mm. Thus, the transfer by the robot arm 35 becomes stabilized." As discussed in paragraphs [0043], [0048] and [0049] of the present application, "[t]o minimize the occurrence of a side miss of the glass substrate 34 due to the film-forming material, a groove 44 is formed at the slide part 42 of the susceptor 30 as shown in Figures 6 to 9. When the glass substrate 34 is slid to the slide part 42 of the susceptor 30, the film-forming material 45 which accumulates by the friction difference between the glass substrate 34 and the susceptor 30 collects in the inside of the groove 44 so that the film-forming material 45 does not contact the glass substrate 34. In this way, when the glass substrate 34 is slid to the susceptor 30, the film-forming material 45 occurs inside of the groove 44. Thereby, the breakage of the glass substrate 34 is prevented."

Figures 6-9 have also been amended to show the stopper pins 40 being included within the groove 44. Original Figure 5 illustrates this feature. Figure 10A-10C, which were previously added have also been amended to include the stopper pins 40. In addition, Figures 11 and 12 previously added are being canceled.

Thus, the present invention solves the problems of the related art by increasing the sliding portion of the susceptor to about 10mm and also by including a groove 44 in the susceptor 30 to catch scraped off material (Figure 11A-11C illustrate the material 45 being scraped off by the sliding substrate 34 and scraped into the groove 44).

Next, comments will be presented distingushing the pending claims over the applied art.

Amended independent claim 1 includes a combination of elements and is directed to a vacuum deposition apparatus including a susceptor for heating a glass substrate, all four edges of the susceptor acting as a sliding portion on which to slide the glass substrate to a stopped

position by stopping pins placed on the sliding portion, lift pins for supporting the glass substrate, a support bar for supporting the susceptor and raising the susceptor with the lift pins such that the glass substrate is supported by the lift pins and the robot arm can be withdrawn from underneath the glass substrate, a robot arm for transferring the glass substrate to a position over the susceptor, and a support bar for 1) supporting the susceptor and raising the susceptor with the lift pins extended when the robot arm transfers the glass substrate to the position over the susceptor such that the glass substrate is raised off of the robot arm and is supported by the lift pins and the robot arm can be withdrawn from underneath the glass substrate, and for 2) lowering the susceptor while the lift pins are withdrawn from being extended such that the edges of the glass subtrate slide along sliding portion of the susceptor until being stopped by the stopping pins at which point the glass substrate is substantially parallel with the susceptor. Further, the susceptor includes a groove formed in said all four edges of said sliding portion at a location of the stopping pins for receiving material resulting from the sliding of the glass substrate on the sliding portion of the susceptor, and a length of said sliding portion, measured from said groove, is about 10 mm. These features are supported at least by Figures 5-10 and the corresponding description in the specification (as described above).

AAPA does not include any groove and specifically includes the claimed dimension of 5mm for the sliding portion. As discussed above, the background art range of 5mm for the sliding portion results in an unstable transfer of the substrate. The excess deposited material is also built up and negatively affects removal of the substrate and subsequent depositing processes.

Further, as shown in Figure 3 of Tepman et al., the groove 38 is formed only on two edges of the substrate support 16A and is not arranged or provided in all four edges of the

support 16A for receiving any scraped off material as in the presently claimed invention. Further, when viewing Figure 3 of Tepman et al., one can see that the edges of the substrate 14 would easily break because the portion where the substrate 14 is lowered onto the support 16A is extremely small and much less than the claimed 10 mm. That is, Tepman et al. is very similar to the conventional process described in the background art of the present application. Thus, the same problem occurs in Tepman et al. as described in the present application. As shown in Figure 3 of Tepman et al., the sliding portion near the groove 38 is about 1 mm, much less than the claimed invention. Thus, there is no stable transfer of the substrate 14 in Tepman et al. The present invention solves the problems with the device in Tepman et al.

Further, the groove 44 in Dubois et al. also is only formed at side edges of the susceptor 26. As shown in Figure 3 of Dubois et al., the sliding portion beginning at reference number 52 is also very small and much less than the 10 mm claimed by the present invention. Accordingly, similar problems exist in Dubois et al.

Accordingly, it is respectfully submitted independent claim 1 and each of the claims depending therefrom are allowable.

Further, it is respectfully submitted the rejection of claims 4 and 10 under 35 U.S.C. § 103(a) noted in the Office Action has also been overcome as Rempei Nakata also does not teach or suggest the features recited in independent claim 1.

CONCLUSION

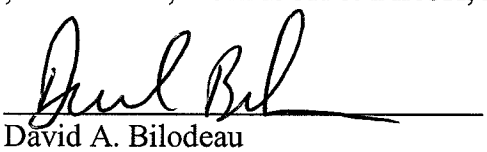
All objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance. Should there be any outstanding matters that need to be resolved, the Examiner is respectfully requested to contact David Bilodeau (Reg. No. 42,325) at 703-205-8072, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Date: June 12, 2009

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By: 

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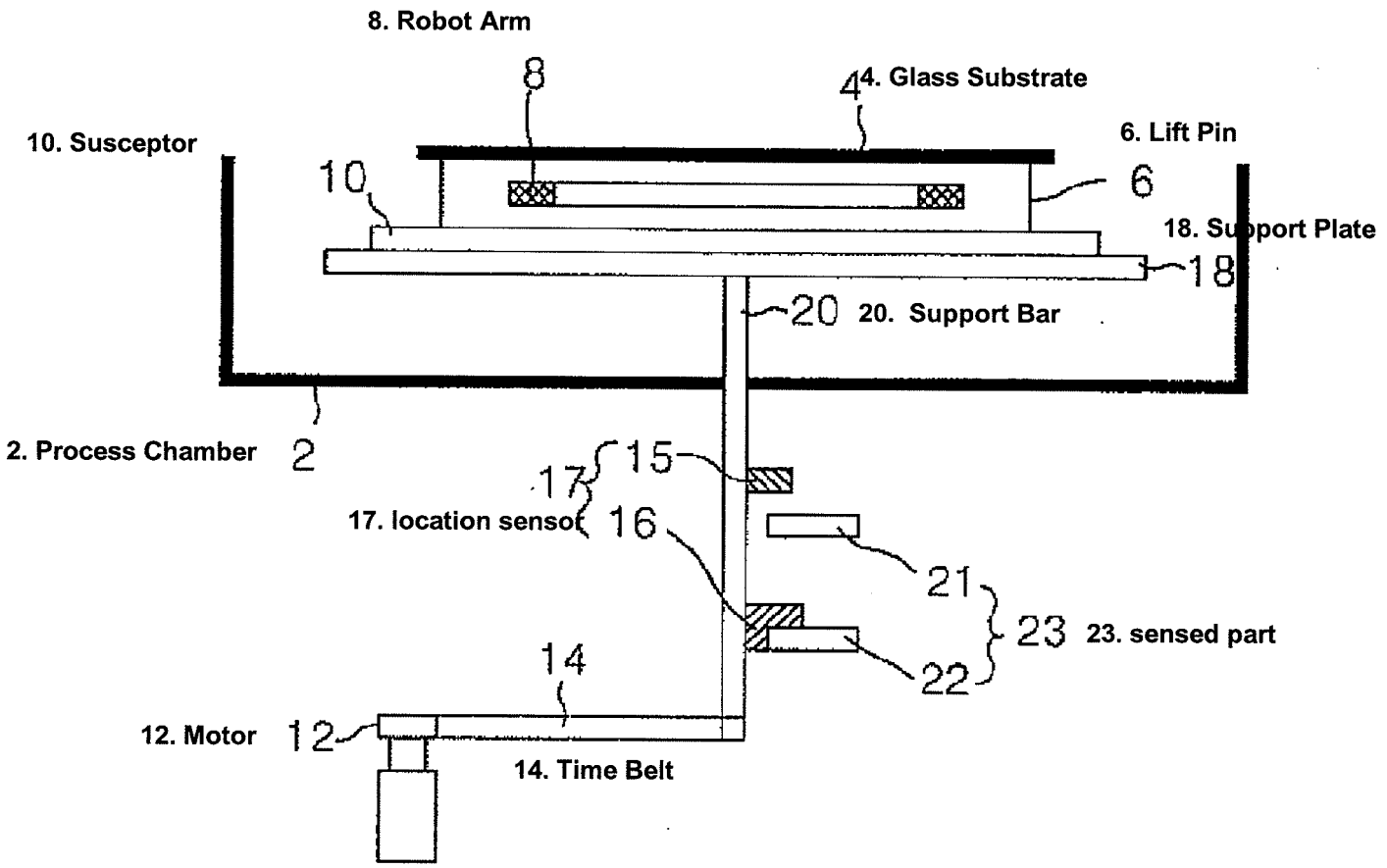
Attachments: Annotated Drawings
Substitute specification (clean copy and marked-up copy)

The operation of vacuum deposition apparatus

[Related art]



The operation of vacuum deposition apparatus

[4 Stages of Loading/Unloading]

- Exchange Position
- Load Position
- Process Position
- Spacing Position

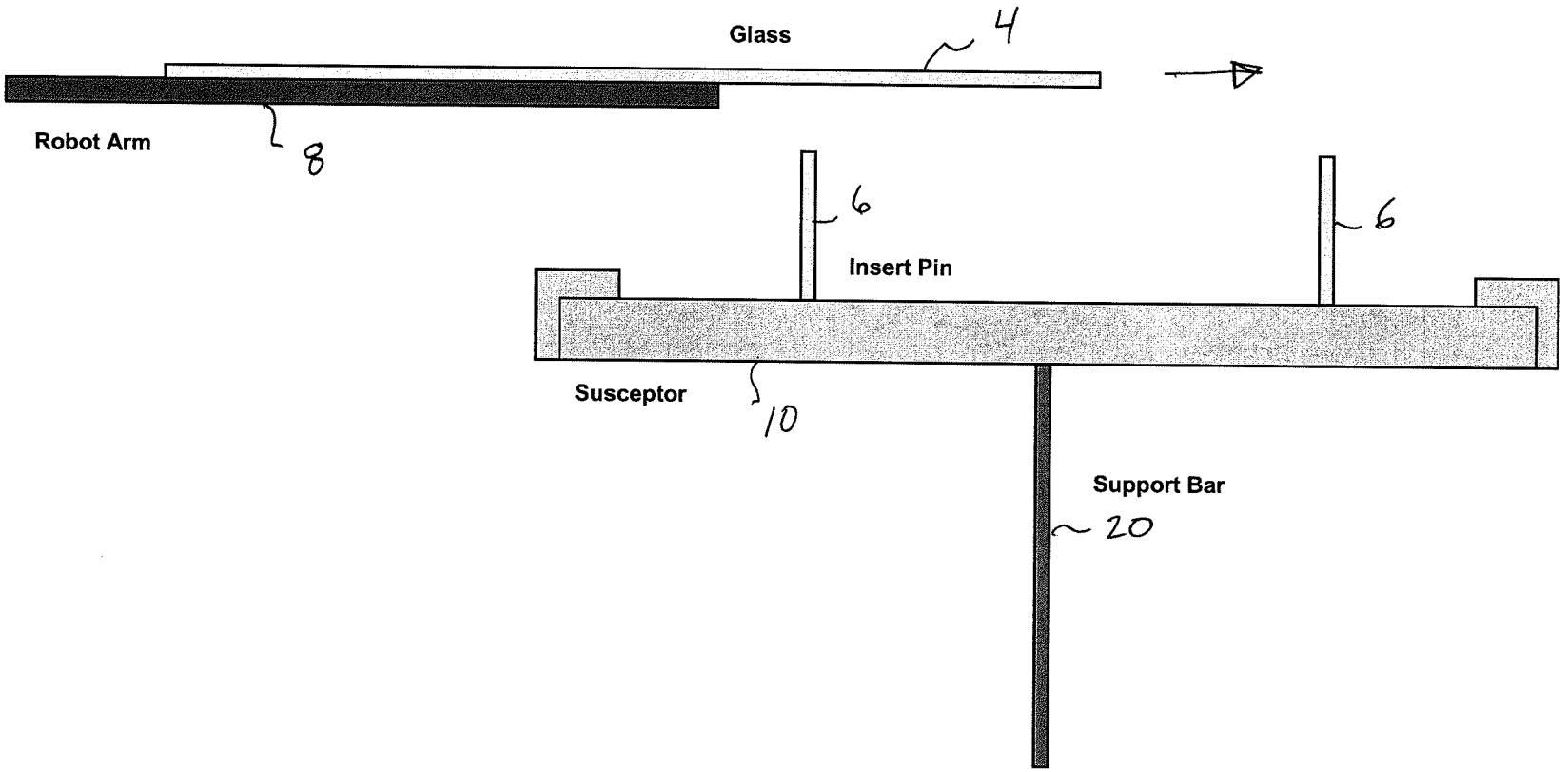
The operation of vacuum deposition apparatus

[Paragraph [0009]]

to move to a corresponding position according to the process. In this case, the susceptor **10** is generally moved to its positions in 4 steps, that is, to the exchange position, to the load position, to the process position and to the spacing position. These positions of the susceptor **10** are determined by the driving time of the time belt **14**.

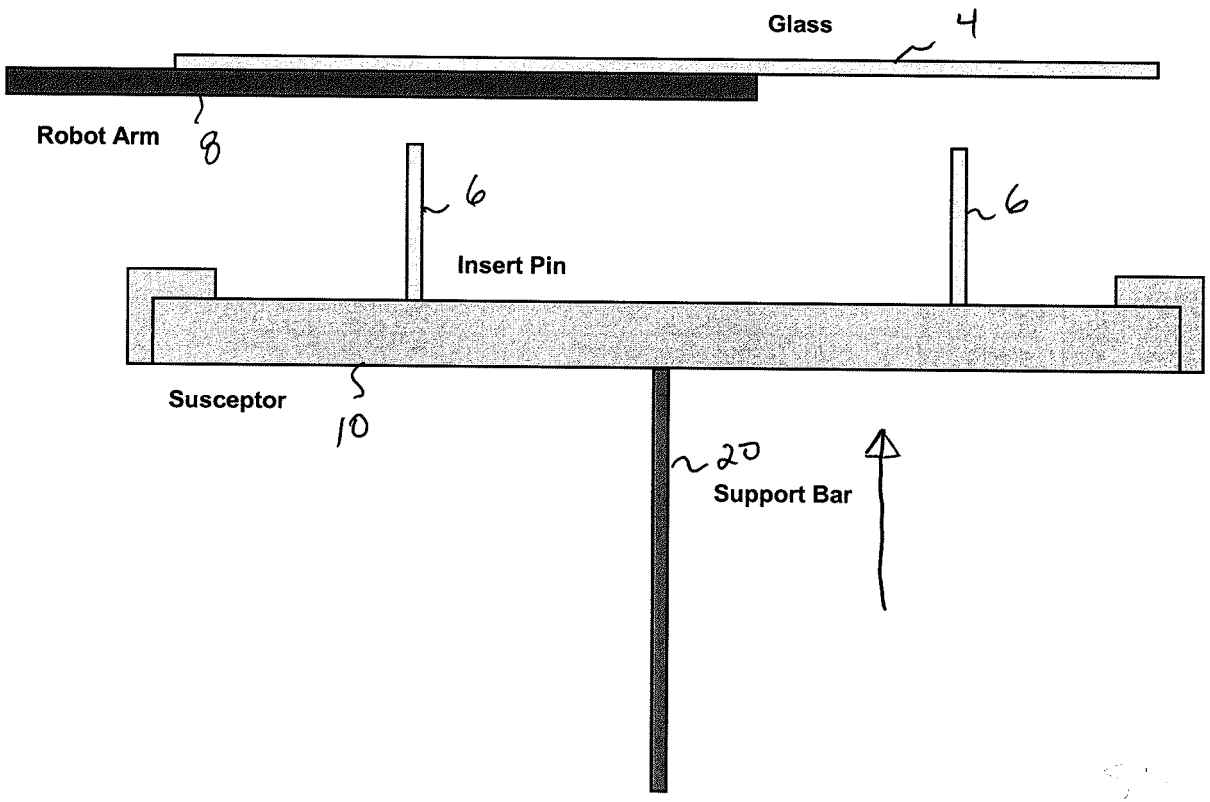
The operation of vacuum deposition apparatus

[Exchange Position]



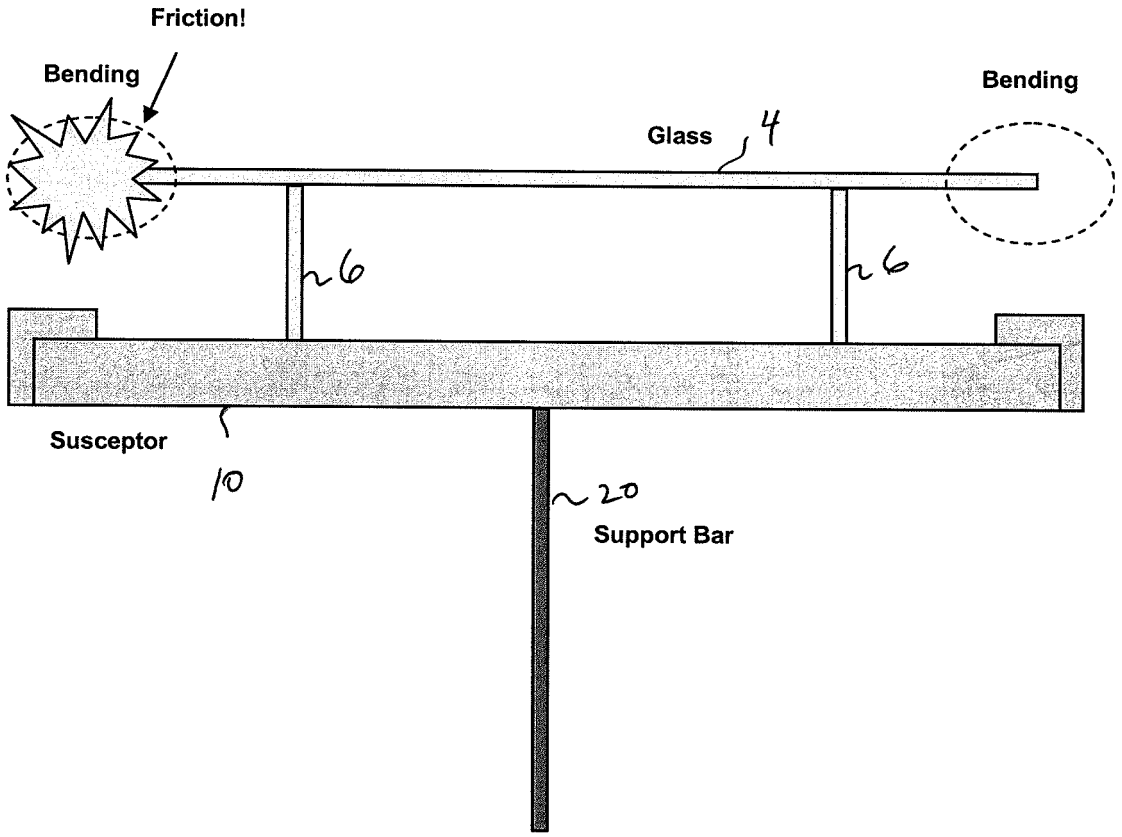
The operation of vacuum deposition apparatus

[Loading Position]



The operation of vacuum deposition apparatus

[Process Position]



The operation of vacuum deposition apparatus

[Spacing Position]